

**THE OFFICE OF REGULATORY STAFF**

**DIRECT TESTIMONY & EXHIBITS**

**OF**

**WILLIE J. MORGAN, P.E.**

**AUGUST 18, 2017**



**DOCKET NO. 2017-3-E**

**Annual Review of Base Rates for Fuel Costs of Duke  
Energy Carolinas, LLC**

**DIRECT TESTIMONY AND EXHIBITS OF**  
**WILLIE J. MORGAN, P.E.**  
**ON BEHALF OF**  
**THE SOUTH CAROLINA OFFICE OF REGULATORY STAFF**  
**DOCKET NO. 2017-3-E**  
**IN RE: ANNUAL REVIEW OF BASE RATES FOR FUEL COSTS OF**  
**DUKE ENERGY CAROLINAS, LLC**

**Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS AND OCCUPATION.**

**A.** My name is Willie J. Morgan, and my business address is 1401 Main Street, Suite 900, Columbia, South Carolina 29201. I am employed by the South Carolina Office of Regulatory Staff ("ORS") as the Deputy Director for Utility Rates.

**Q. PLEASE STATE YOUR EDUCATIONAL BACKGROUND AND EXPERIENCE.**

**A.** I received a Bachelor of Science Degree in Engineering from the University of South Carolina in 1985 and a Master of Arts Degree in Management from Webster University in 2000. I am a licensed Professional Engineer registered in the State of South Carolina. I was employed by the South Carolina Department of Health and Environmental Control ("DHEC") as an Environmental Engineer Associate. Later, I was promoted to the position of Permitting Liaison where I assisted industries and the public with environmental permitting requirements in the State of South Carolina. This assistance included providing information about air quality, solid and hazardous waste management, and water and wastewater management requirements. I was employed by DHEC for nineteen (19) years. In October 2004, I joined ORS as the Program Manager

for the Water and Wastewater Department and was promoted to Deputy Director in 2015. Collectively, I have over thirty-one (31) years of regulatory compliance experience providing assistance and oversight for various types of regulated utilities. I am the immediate past-President of the South Carolina Society of Professional Engineers – Columbia Chapter.

**Q. HAVE YOU TESTIFIED PREVIOUSLY BEFORE THE PUBLIC SERVICE COMMISSION OF SOUTH CAROLINA (“COMMISSION”)?**

**A.** Yes. I have testified on numerous occasions before the Commission in connection with hearings concerning general rate cases and other proceedings.

**Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

**A.** The purpose of my testimony is to set forth the ORS’s recommendations resulting from our examination and review of Duke Energy Carolinas, LLC’s (“DEC” or “Company”) fuel expenses and power plant operations used in the generation of electricity to meet the Company’s South Carolina retail customer requirements during the review period. The review period includes the actual data for June 2016 through May 2017 (“Actual Period”), estimated data for June 2017 through September 2017 (“Estimated Period”), and forecasted data for October 2017 through September 2018 (“Forecasted Period”).

**Q. WHAT DID YOUR REVIEW OF THE COMPANY’S FUEL EXPENSES AND PLANT OPERATIONS INVOLVE?**

**A.** ORS examined various fuel and performance related documents as part of our review. These documents addressed the Company’s electric generation and power plant outage and maintenance activities. In preparation for this proceeding, ORS analyzed the

Company's monthly fuel reports including power plant performance data, unit outages and generation statistics. ORS examined the Company's contracts for nuclear fuel, coal, natural gas, fuel oil, transportation, and environmental reagents. ORS also evaluated the Company's policies and procedures for fuel procurement. All information was reviewed with reference to the Company's existing Adjustment for Fuel, Variable Environmental, Avoided Capacity, S.C. Code Ann. §58-27-865 (2016) (the "Fuel Clause Statute"), and the approved South Carolina Distributed Energy Resource Program ("DERP").

**Q. WHAT ADDITIONAL STEPS WERE TAKEN IN ORS'S REVIEW OF THE COMPANY'S PROPOSAL IN THIS PROCEEDING?**

A. ORS met with Company personnel from various departments to discuss and review fossil and nuclear fuel procurement, fuel transportation, environmental compliance costs and procedures, emission allowances, generation plant performance, distributed energy resources, forecasting, and general Company policies and procedures pertaining to fuel procurement. These meetings occurred at ORS offices as well as DEC's headquarters in Charlotte, NC. In addition, ORS monitors the nuclear, coal, natural gas, transportation and renewable industries through industry and governmental publications. In April 2017, ORS attended meetings hosted by the Nuclear Regulatory Commission ("NRC") for the Oconee and Catawba nuclear generation stations in Seneca, SC and Rock Hill, SC, respectively.

**Q. DID ORS EXAMINE THE COMPANY'S PLANT OPERATIONS FOR THE ACTUAL PERIOD?**

A. Yes. ORS reviewed the performance of the Company's generation units to determine if the Company made reasonable efforts to maximize unit availability and

1 minimize fuel costs. ORS also reviewed the operating statistics of the Company's power  
2 plants by unit. Exhibit WJM-1 shows, in percentages, the annual availability, capacity,  
3 and forced outage factors of the Company's major generation units during the Actual  
4 Period. This Exhibit also includes the North American Electric Reliability Corporation  
5 ("NERC") national five-year (2011-2015) averages for availability, capacity, and forced  
6 outage factors for each type of generation plant.

7 **Q. PLEASE EXPLAIN HOW THE OUTAGES ARE REPRESENTED ON EXHIBITS**  
8 **WJM-2 THROUGH WJM-4.**

9 **A.** Exhibits WJM-2 and WJM-3 summarize outages lasting seven (7) or more days  
10 for major coal and natural gas units during the Actual Period, respectively. While not all  
11 plant outages were included in these Exhibits, all outages were reviewed and found to be  
12 reasonable by ORS. As shown in Exhibit WJM-4, there were six (6) separate outages  
13 involving DEC's nuclear units, including four (4) scheduled refueling outages, one (1)  
14 maintenance outage, and one (1) forced outage during the Actual Period. The three (3)  
15 nuclear stations, which house a total of seven (7) units, achieved an overall average  
16 availability factor of 95.32% and an average capacity factor of 95.97% for the Actual  
17 Period, as shown in Exhibit WJM-1.

18 **Q. WHAT WERE THE RESULTS OF YOUR ANALYSIS OF THE COMPANY'S**  
19 **POWER PLANT OPERATIONS FOR THE ACTUAL PERIOD?**

20 **A.** ORS's review of the Company's operation of its generation facilities during the  
21 Actual Period revealed that the Company made reasonable efforts to maximize unit  
22 availability and minimize fuel costs.

1 **Q. DID ORS REVIEW THE COMPANY'S GENERATION MIX DURING THE**  
2 **ACTUAL PERIOD?**

3 **A.** Yes. Exhibit WJM-5 shows the generation mix for the Actual Period by  
4 percentage and generation type. As shown in this Exhibit, the nuclear, coal, and natural  
5 gas plants contributed an average of 55.97%, 25.12% and 10.30%, respectively, of the  
6 Company's generation throughout the Actual Period. This equates to approximately  
7 91.39% of the Company's generation for the Actual Period. The remainder of the  
8 generation was met through a mix of hydroelectric, renewables, purchased power, and  
9 Joint Dispatch Agreement ("JDA") purchases.

10 **Q. DID ORS EXAMINE THE COMPANY'S FUEL COSTS ON A PLANT-BY-**  
11 **PLANT BASIS FOR THE ACTUAL PERIOD?**

12 **A.** Yes. Exhibit WJM-6 shows the average fuel costs for the major generation plants  
13 on the Company's system for the Actual Period and the megawatt-hours ("MWh")  
14 produced by those plants. The chart shows the lowest average fuel cost of 0.675  
15 cents/kilowatt-hour ("kWh") at Oconee Nuclear Station and the highest average fuel cost  
16 of 4.118 cents/kWh at Allen Steam Station. The Company utilizes economic dispatch  
17 which generally requires that the lower cost units be dispatched first.

18 **Q. DID ORS REVIEW THE COMPANY'S ENVIRONMENTAL COMPLIANCE**  
19 **RELATED COSTS?**

20 **A.** Yes. ORS reviewed the Company's environmental compliance related costs  
21 including allowances for nitrogen oxide ("NOx") and sulfur dioxide ("SO<sub>2</sub>") emissions,  
22 reagents (i.e., limestone, ammonia, urea, etc.), and chemicals used in the reduction of  
23 these emissions. The use of these chemicals and reagents reduces the Company's NOx

and SO<sub>2</sub> emissions, and the costs associated with the use of these substances are included in the Company's Adjustment for Fuel, Variable Environmental, Avoided Capacity, and Distributed Energy Resource Program Costs tariff as provided by the Fuel Clause Statute.

**Q. HAS ORS REVIEWED THE ACCURACY OF THE COMPANY'S FORECAST?**

**A.** Yes. As shown in Exhibit WJM-7, the Company's actual MWh sales were 0.03% lower than expected during the Actual Period. Exhibit WJM-8 shows that, on average, the actual fuel costs for the Actual Period were 8.15% higher than the projected monthly fuel costs.

**Q. HAS ORS REVIEWED THE COMPANY'S PROPOSED RECLASSIFICATION OF FIRM NATURAL GAS TRANSPORTATION AND STORAGE COSTS AS CAPACITY COSTS?**

**A.** Yes. ORS reviewed the Company's proposal to reclassify firm natural gas transportation and storage costs as capacity costs. In Act 236, the South Carolina General Assembly included a specific requirement that all capacity costs that are recovered through the fuel factor must be allocated and recovered in a separate component of the fuel factor. After reviewing fuel costs in accordance with the Settlement Agreement in Docket No. 2016-227-E and Commission Order No. 2017-405 in Docket No. 2017-1-E, DEC identified an additional category of fuel costs that can be classified as capacity costs under the fuel factor – firm natural gas transportation and storage costs. Based on its analysis, DEC proposes that these fuel costs be classified, allowed, and recovered as capacity costs. In this case, ORS does not object to the Company's proposal to treat natural gas transportation and storage costs as capacity costs.

**Q. WHAT IS THE IMPACT OF THE PROPOSAL TO RE-CLASSIFY FIRM NATURAL GAS TRANSPORTATION AND STORAGE COSTS AS CAPACITY COSTS?**

**A.** The amendment to the Fuel Clause Statute by Act 236 requires any costs that are classified as capacity and recovered through the fuel factor to be allocated and recovered in the same method that is used to allocate and recover variable environmental costs. Therefore, under the Company's proposal, firm natural gas transportation and storage costs are to be allocated by each customer class' contribution to the Company's peak demand. Historically, these costs have been allocated and recovered based on energy. The change in allocation will save the Industrial customer class approximately \$1.87 million. The average monthly bill for a residential customer on Rate RS using 1,000 kWh ("Average Bill") will increase by \$0.27 as a result of the new classification and allocation.

**Q. HAS ORS DETERMINED THE PRIMARY DRIVERS OF THE COMPANY'S REQUEST FOR A RATE CHANGE IN THIS PROCEEDING?**

**A.** Yes. Exhibit WJM-9 shows ending period balances of base fuel, environmental, avoided capacity, and DERP avoided costs beginning in June 2007. As of May 2017, the Company had a base fuel cumulative under-recovery balance of \$7,670,353, a variable environmental over-recovery balance of \$2,985,690, avoided capacity under-recovery balance of \$792,575, and DERP avoided costs over-recovery balance of \$235,096. As shown on ORS witness Smith's Exhibit GS-5, page 2 of 2, ORS projects the Company to have a base fuel cumulative under-recovery balance of \$17,817,201, a variable environmental over-recovery balance of \$526,602, an avoided capacity over-recovery

balance of \$513,721, and DERP avoided costs over-recovery balance of \$118,548 by September 2017. The Company's request for an increase is driven primarily by an under-collection of fuel costs included in the 2017 proposed base fuel rates as compared to an over-collection reflected in existing rates. In addition, there is a decrease in DERP incremental costs included in the 2017 proposed DERP per account charges as compared to existing rates.

**Q. WHAT CHANGES DOES THE COMPANY REQUEST TO ITS CURRENTLY APPROVED FACTORS?**

A. DEC requests that the Commission approve an increase in its currently approved Base Fuel Component ("Base Fuel Component") for the Forecasted Period. Additionally, the Company has requested to update its Variable Environmental ("Environmental Component"), Avoided Capacity Cost Component ("Avoided Capacity Component"), and DERP Avoided Cost Component ("DERP Avoided Cost Component") to reflect the Company's forecasted expenses and allocation of these expenses to each class of customer based on its contribution to the Company's summer 2016 peak. Finally, the Company requests that the proposed reclassification of firm natural gas transportation and storage costs as capacity costs be approved by the Commission and incorporated into the calculation of its fuel rates.

**Q. ARE THERE ANY OTHER ADJUSTMENTS IN THIS PROCEEDING?**

A. Yes. As addressed by ORS witness Hipp, ORS recommends making adjustments to the Company's DERP Avoided Costs in the Actual Period and the Forecasted Period. These adjustments are reflected in ORS Accounting Adjustment 4 and incorporated into Exhibit WJM-9.

**Q. ARE THERE ANY ADDITIONAL FACTORS IN THIS DOCKET THAT WILL IMPACT CUSTOMERS' BILLS?**

**A.** Yes. The Company has included proposed rates related to its DERP incremental expenses. ORS witness Hipp specifically addresses the Company's incremental expenses to be recovered as a fixed charge ("DERP Charge") on customers' bills and the Company's DERP avoided costs.

**Q. WHAT IMPACT WILL ORS'S PROPOSED ADJUSTMENTS HAVE ON A RESIDENTIAL CUSTOMER'S BILL?**

**A.** Exhibit WJM-10 calculates the ORS proposed DERP Avoided Cost Component for each customer class. Exhibit WJM-11 reflects a summary of the ORS proposed fuel factor components and the Company's recommended Base Fuel, Environmental, Avoided Capacity, and DERP Avoided Costs Component for each customer class to reflect the Company's forecasted expenses and allocation of these expenses to each class of customer. If approved by the Commission, the ORS rates proposed in this proceeding, including the recommended DERP Charge addressed by ORS witness Hipp, would increase the Average Bill from \$111.34 to approximately \$112.62, a net increase of \$1.28 or 1.15%.

**Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

**A.** Yes, it does.

**Office of Regulatory Staff**  
**Power Plant Performance Data**  
**Duke Energy Carolinas, LLC**  
**Docket No. 2017-3-E**

EXHIBIT WJM-1

			<i>Actual Period Data</i>		
Coal Plants	Unit	MW Rating	Average Availability Factor (%)	Average Capacity Factor (%)	Average Forced Outage Factor (%)
Belews Creek	1	1,110	86.84	57.84	4.24
Belews Creek	2	1,110	84.88	56.84	1.85
Cliffside	5	544	90.13	22.54	0.16
Cliffside	6	844	85.28	65.21	1.21
Marshall	1	370	87.01	46.18	1.84
Marshall	2	370	71.54	31.81	9.64
Marshall	3	658	71.86	51.65	1.47
Marshall	4	660	86.27	63.95	2.10
<b>Coal Totals</b>		<b>5,666</b>	<b>83.74</b>	<b>52.78</b>	<b>2.56</b>
<i>NERC 5-year average (All Coal Plants)</i>			<b>85.29</b>	<b>58.49</b>	<b>4.61</b>

  

CC Plants <sup>1</sup>	Unit	MW Rating	Average Availability Factor (%)	Average Capacity Factor (%)	Average Forced Outage Factor (%)
Buck	10	668	95.83	83.37	0.16
Dan River	7	662	92.28	80.32	0.40
<b>CC Totals</b>		<b>1,330</b>	<b>94.04</b>	<b>81.85</b>	<b>0.28</b>
<i>NERC 5-year average (CC Plants)</i>			<b>87.66</b>	<b>51.57</b>	<b>2.69</b>

  

Nuclear Plants	Unit	MW Rating	Average Availability Factor (%)	Average Capacity Factor (%)	Average Forced Outage Factor (%)
Catawba	1	1,160	93.36	94.54	0.00
Catawba	2	1,150	92.08	92.20	0.00
McGuire	1	1,158	100.00	101.88	0.00
McGuire	2	1,158	89.94	89.91	3.55
Oconee	1	847	91.83	92.06	0.00
Oconee	2	848	100.00	101.86	0.00
Oconee	3	859	100.00	101.14	0.00
<b>Nuclear Totals</b>		<b>7,180</b>	<b>95.32</b>	<b>95.97</b>	<b>0.51</b>
<i>NERC 5-year average (All Nuclear Plants)</i>			<b>89.42</b>	<b>88.45</b>	<b>2.92</b>

<sup>1</sup> CC designates Combined-Cycle units

**Office of Regulatory Staff**  
**Coal Unit Outages - 7 Days or Greater Duration**  
**Duke Energy Carolinas, LLC**  
**Docket No. 2017-3-E**

EXHIBIT WJM-2

Unit	Date Offline	Date Online	Hours	Outage Type	Explanation of Outage
Belews Creek 1	11/10/16	12/4/16	573.5	Planned	Unit taken offline for a planned Fall outage.
Belews Creek 2	10/1/16	10/30/16	712.1	Planned	Unit taken offline for a planned Fall outage.
Belews Creek 2	2/7/17	2/15/17	194.5	Maintenance	Unit taken offline to repair reheater tube leaks and bypass valves.
Belews Creek 2	4/22/17	5/1/17	216.6	Planned	Unit taken offline for a planned Spring outage.
Cliffside 5	9/17/16	10/8/16	514.0	Planned	Unit taken offline for a planned Fall outage.
Cliffside 6	10/15/16	11/6/16	526.6	Planned	Unit taken offline for a planned Fall outage.
Cliffside 6	11/6/16	11/15/16	234.0	Outage Extension	Scheduled maintenance outage extended due to emergent issues.
Cliffside 6	4/22/17	4/30/17	191.4	Planned	Unit taken offline for a planned Spring outage.
Cliffside 6	4/30/17	5/4/17	109.3	Outage Extension	Scheduled maintenance outage extended due to emergent issues.
Marshall 1	11/26/16	12/19/16	561.8	Maintenance	Unit taken offline to repair turbine control valves.
Marshall 2 <sup>1</sup>	2/22/16	6/29/16	3,064.0	Planned	Unit taken offline for a planned Spring outage.
Marshall 2	9/20/16	10/1/16	255.3	Maintenance	Unit taken offline to repair electric static precipitator.
Marshall 2	11/10/16	11/20/16	248.0	Maintenance	Unit taken offline to repair electric static precipitator.
Marshall 2	5/9/17	5/28/17	460.0	Maintenance	Unit taken offline to repair high pressure heater tube leaks.
Marshall 3	3/3/17	5/29/17	2,074.8	Planned	Unit taken offline for a planned Spring outage.
Marshall 4	9/16/16	10/7/16	494.8	Maintenance	Unit taken offline to repair turbine control valves.
Marshall 4	3/17/17	4/7/17	506.7	Planned	Unit taken offline for a planned Spring outage.

<sup>1</sup> This outage began prior to the Actual Period.

**Office of Regulatory Staff**  
**Natural Gas Unit Outages - 7 Days or Greater Duration**  
**Duke Energy Carolinas, LLC**  
***Docket No. 2017-3-E***

EXHIBIT WJM-3

Unit	Date Offline	Date Online	Hours	Outage Type	Explanation of Outage
<b>Buck</b>	10/21/16	10/29/16	194.9	Planned	Unit taken offline for a planned Fall outage.
<b>Dan River</b>	9/30/16	10/9/16	210.1	Planned	Unit taken offline for a planned Fall outage.
<b>Dan River</b>	4/14/17	5/2/17	430.1	Planned	Unit taken offline for a planned Spring outage.

**Office of Regulatory Staff**  
**Nuclear Unit Outages**  
**Duke Energy Carolinas, LLC**  
**Docket No. 2017-3-E**

EXHIBIT WJM-4

Unit	Date Offline	Date Online	Hours	Outage Type	Explanation of Outage
Catawba 1	4/29/17	5/23/17	581.3	Planned	Unit taken offline for a scheduled refueling outage.
Catawba 2	9/10/16	10/9/16	693.8	Planned	Unit taken offline for a scheduled refueling outage.
McGuire 2	2/24/17	3/8/17	310.7	Forced	Unit forced offline due to injection line leak and valve leak.
McGuire 2	3/30/17	4/22/17	570.7	Planned	Unit taken offline for a scheduled refueling outage.
Oconee 1	11/4/16	11/27/16	538.6	Planned	Unit taken offline for a scheduled refueling outage.
Oconee 1	2/18/17	2/25/17	176.9	Maintenance	Unit taken offline to repair a reactor coolant pump seal.

**Office of Regulatory Staff**  
**Generation Mix (Percentage)**  
**Duke Energy Carolinas, LLC**  
*Docket No. 2017-3-E*

**EXHIBIT WJM-5**

	2016							2017					
	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Average
<b>Nuclear</b>	53.41	49.50	49.49	50.56	63.00	58.88	58.83	59.24	60.01	56.31	55.26	57.20	<b>55.97</b>
<b>Coal</b>	28.92	31.14	31.71	29.01	21.66	16.75	26.04	23.46	16.14	24.28	26.49	25.83	<b>25.12</b>
<b>Natural Gas</b>	9.36	10.31	10.47	12.07	8.82	13.94	9.47	9.58	11.00	10.73	7.03	10.78	<b>10.30</b>
<b>Hydroelectric</b>	-0.11	-0.25	0.03	-0.13	0.34	-0.03	-0.06	0.09	0.28	0.26	2.08	1.83	<b>0.36</b>
<b>Solar</b>	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.04	0.05	0.14	0.17	<b>0.04</b>
<b>Wind</b>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<b>0.00</b>
<b>Biomass</b>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<b>0.00</b>
<b>Purchased Power</b>	2.63	4.23	4.08	2.57	2.54	4.97	2.98	3.57	5.03	5.40	6.49	0.25	<b>3.73</b>
<b>JDA Purchases</b>	5.76	5.06	4.19	5.91	3.62	5.47	2.73	4.04	7.49	2.97	2.50	3.95	<b>4.47</b>

*Numbers may not equal 100% due to rounding.*

**Office of Regulatory Staff**  
**Generation Statistics for Major Plants**  
**Duke Energy Carolinas, LLC**  
**Docket No. 2017-3-E**

**EXHIBIT WJM-6**

<b>Plant</b>	<b>Fuel Type</b>	<b>Average Fuel Cost (¢/kWh) <sup>1</sup></b>	<b>Generation (MWh)</b>
<b>Oconee</b>	Nuclear	0.675	22,007,452
<b>Catawba</b>	Nuclear	0.732	18,797,838
<b>McGuire</b>	Nuclear	0.747	19,455,310
<b>Buck CC</b>	Natural Gas	2.515	4,967,123
<b>Dan River CC</b>	Natural Gas	2.536	4,740,262
<b>Belews Creek</b>	Coal	3.026	11,151,431
<b>Marshall</b>	Coal	3.258	9,270,147
<b>Cliffside</b>	Coal	3.832	5,916,847
<b>Allen</b>	Coal	4.118	1,426,602

<sup>1</sup> *Includes Base Fuel and Environmental Costs.*

**Office of Regulatory Staff**  
**Comparison of South Carolina Estimated to Actual Energy Sales**  
**Duke Energy Carolinas, LLC**  
*Docket No. 2017-3-E*

**EXHIBIT WJM-7**

		2016							2017					Period Total
		June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	
[1]	<b>Actual Sales (MWh)</b>	1,887,789	2,087,906	2,121,610	2,102,968	1,734,041	1,594,181	1,683,338	1,780,633	1,642,088	1,560,811	1,831,776	1,441,264	21,468,405
[2]	<b>Estimated Sales (MWh)</b>	1,826,603	1,955,343	2,051,024	1,960,348	1,669,442	1,598,835	1,820,322	1,863,110	1,813,854	1,673,395	1,614,115	1,628,906	21,475,297
[3]	<b>Difference [1]-[2]</b>	61,186	132,563	70,586	142,620	64,599	-4,654	-136,984	-82,477	-171,766	-112,584	217,661	-187,642	-6,892
[4]	<b>Percent Difference [3]/[2]</b>	3.35%	6.78%	3.44%	7.28%	3.87%	-0.29%	-7.53%	-4.43%	-9.47%	-6.73%	13.48%	-11.52%	-0.03%

**Office of Regulatory Staff**  
**Comparison of South Carolina Estimated to Actual Fuel Cost**  
**Duke Energy Carolinas, LLC**  
**Docket No. 2017-3-E**

**EXHIBIT WJM-8**

		2016							2017					Period Average
		June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	
[1]	<b>Actual Experience (\$/kWh)</b>	2.1935	2.3884	2.1844	1.9287	1.7282	1.9225	2.1044	1.9661	1.7252	2.0319	1.5738	2.1745	1.9935
[2]	<b>Original Projection (\$/kWh)</b>	2.1260	2.0091	1.8984	1.7558	1.7115	1.7958	2.0175	1.8514	1.6715	1.6503	1.6846	1.9466	1.8432
[3]	<b>Amount in Base (\$/kWh)</b>	2.1447	2.1447	2.1447	2.1447	1.5877	1.5877	1.5877	1.5877	1.5877	1.5877	1.5877	1.5877	1.7734
[4]	<b>Variance from Actual [1-2]/[2]</b>	3.17%	18.88%	15.07%	9.85%	0.98%	7.05%	4.30%	6.19%	3.21%	23.13%	-6.57%	11.71%	8.15%

**Office of Regulatory Staff**  
**History of Cumulative Recovery Accounts**  
**Duke Energy Carolinas, LLC**  
**Docket No. 2017-3-E**

**EXHIBIT WJM-9**

Period Ending	Base Fuel (Over)/Under	Environmental (Over)/Under	Avoided Capacity (Over)/Under	DERP Avoided Costs (Over)/Under
June-07	\$ (1,632,482)	N/A	N/A	N/A
May-08	\$ 11,889,851	\$ 335,945	N/A	N/A
May-09	\$ (44,315,294)	\$ (3,514,786)	N/A	N/A
May-10	\$ (53,785,597)	\$ (3,242,609)	N/A	N/A
May-11	\$ 528,767	\$ (3,595,468)	N/A	N/A
May-12	\$ (41,792,888)	\$ (7,198,018)	N/A	N/A
May-13	\$ (25,476,878)	\$ (6,084,377)	N/A	N/A
May-14	\$ 35,958,217	\$ (1,788,254)	N/A	N/A
May-15	\$ 30,787,463	\$ (1,634,322)	\$ 1,048,969	N/A
May-16	\$ (35,017,408)	\$ (4,759,509)	\$ 1,875,605	\$ (263,642)
May-17	\$ 7,670,353	\$ (2,985,690)	\$ 792,575	\$ (235,096)

**Office of Regulatory Staff**  
**Calculation of DERP Avoided Costs**  
**Duke Energy Carolinas, LLC**  
*Docket No. 2017-3-E*

**EXHIBIT WJM-10**

Projected DERP Avoided Costs: October 2017 through September 2018			
	Residential	General Service / Lighting	Industrial
DERP Avoided Costs	\$ 2,889	\$ 1,917	\$ 2,056
Projected Allocated S.C. Retail Sales (MWh)	6,412,993	5,779,519	9,427,168
Average Cost (¢/kWh)	0.0000	0.0000	0.0000
Revenue Difference To be Collected from October 2017 through September 2018			
(Over)/Under-Recovery at September 30, 2017	\$ (96,269)	\$ (28,366)	\$ 6,088
Projected Allocated S.C. Retail Sales (MWh)	6,412,993	5,779,519	9,427,168
Average Cost (¢/kWh)	(0.0015)	(0.0005)	0.0001
Projected DERP Avoided Costs per kWh: Projected Period			
DERP Avoided Costs (¢/kWh)	0.0000	0.0000	0.0000
Revenue Difference (¢/kWh)	(0.0015)	(0.0005)	0.0001
<b>DERP Avoided Component (¢/kWh)</b>	<b>(0.0015)</b>	<b>(0.0005)</b>	<b>0.0001</b>

**Office of Regulatory Staff**  
**Proposed Fuel Factors**  
**Duke Energy Carolinas, LLC**  
*Docket No. 2017-3-E*

EXHIBIT WJM-11

Customer Class	DEC Proposed Fuel Factors (¢/kWh)					ORS Proposed Fuel Factors (¢/kWh)				
	Base Fuel Component	Environmental Component	Avoided Capacity Component	DERP Avoided Cost Component	Total Fuel Factor	Base Fuel Component	Environmental Component	Avoided Capacity Component	DERP Avoided Cost Component	Total Fuel Factor
<b>Residential</b>	1.7270	0.0331	0.1183	(0.0015)	1.8769	1.7270	0.0331	0.1183	(0.0015)	1.8769
<b>General Service / Lighting</b>	1.7270	0.0415	0.0959	(0.0005)	1.8639	1.7270	0.0415	0.0959	(0.0005)	1.8639
<b>Industrial</b>	1.7270	0.0267	0.0623	0.0001	1.8161	1.7270	0.0267	0.0623	0.0001	1.8161